about the existence of natural groups constituting separate creations." The whole is in his opinion a question of degree.

What is the outcome of the tendencies of modern scientific thought, materialism and the reign of physical law? The logical and courageous philosopher with the modesty of true science will exclaim with our author, after a survey of the little that is positively known of the laws of nature that "before a rigorous logical scrutiny the Reign of Law will prove to be an unverified hypothesis, the Uniformity of Nature an ambiguous expression, the certainty of our scientific inferences to a great extent a delusion."

The closing paragraphs of the book leave an excellent impression, and its whole tendency is to induce that attitude of the mind which characterizes the true philosopher who, as our author quotes from Faraday, "should be a man willing to listen to every suggestion, but determined to judge for himself. He should not be biased by appearances; have no favourite hypothesis; be of no school: and in doctrine have no master. He should not be a respecter of persons, but of things. Truth should be his primary object. If to these qualities be added industry, he may indeed hope to walk within the veil of the temple of nature."

SCAMMON'S MARINE MAMMALS OF THE NORTHWESTERN COAST AND AMERICAN WHALE-FISHERY.*—The title of Capt. Scammon's important work indicates sufficiently its object and scope. It is divided into three parts, besides containing a lengthy appendix. Part I (comprising 112 pp.) is devoted to the natural history of the Cetacea, or the whales, porpoises and dolphins. Part II (69 pp.) treats in a similar way of the Pinnipedia, or the seals, while Part III (87 pp.) contains a concise and very interesting history of the American Whale-fishery. In Part I, the author has before him an almost wholly unworked field, and one in which he proves himself to have been an intelligent and faithful laborer. The marine mammals, and especially the Cetacea, from the nature of the element in which they live, as well as their generally unwieldy proportions and wary dispositions, are among the most difficult animals to study that the naturalist encounters. Only a

* The Marine Mammals of the Northwestern Coast of North America, described and illustrated: together with an account of the American Whale-fishery. By Charles M. Scammon, Captain U. S. Revenue Marine. San Francisco: John H. Carmany & Co. 1874. 4to, 319 pp., with 27 lithographic plates and numerous woodcuts.

naturalist who combines with his scientific knowledge the experience of a whaleman could even hope to give more than a very inadequate account of the habits of these "monsters of the deep." The immense size of many of the larger Cetacea, and the great infrequency of opportunities of observing them stranded, or wholly removed from the water, render it very difficult to get either accurate figures of them or more than approximate measurements. Capt. Scammon seems to have enjoyed rare opportunities for collecting material for his book, and an excellent preparation for the task he has undertaken, for, besides his twenty years of personal experience and observation, he has availed himself of information acquired by other intelligent whalemen. Hence his biographies, statistics of size, and his figures of the animals are far more satisfactory than anything that has previously appeared treating of the general history of these little known animals. Fourteen pages, for instance, are devoted to the California gray whale (*Rhachianectes glaucus* Cope) in which is detailed not only its habits and distribution, but the methods and dangers of its pursuit and capture; the article being also illustrated with three lithographic plates. The bowhead or great polar whale (*Balæna mysticetus*) receives an equally extended notice, this species being "by far the most valuable in a commercial point of view of all the *Balænidæ* and is the chief object of pursuit by the whaleman in the northern seas." The yield of oil, in large individuals of this species, is said to exceed sometimes two hundred and seventy-five barrels, while the product of baleen may be upwards of three thousand five hundred pounds. The whaling grounds are described at length, as is also what is termed "Bowhead Whaling." Capt. Scammon considers it as conclusively proved that this species passes from the Atlantic to the Pacific, "or rather," as he expresses it, "from the Atlantic Arctic to the Pacific Arctic by the North," and believes that air-holes always exist in the ice which covers the arctic waters, even in the coldest latitudes. About a dozen pages are devoted to the sperm whale (*Physeter macrocephalus*), and about five to the orca, or killer, which is, of all the Cetacea, the most rapacious and terrible to the larger denizens of the sea.

In Part II the ground is less new, but here very material contributions are made to a better knowledge of several species of the larger Pinnipeds, especially of the sea elephants, sea lions, and fur seals of the California coast, and also of the sea otter

(*Enhydra marina*), which is singularly included with the Pinnipedia! The history of the wholesale destruction of these animals for commercial purposes possesses a peculiar and rather melancholy interest. Besides adding much new matter to the history of the fur seal as observed by the writer on the California coast, the chapter is made much more complete by the quotation of the greater part of Capt. Bryant's excellent article on the fur seals of Alaska, published a few years since in the Bulletin of the Museum of Comparative Zoology.*

Part III is possibly the most interesting portion to the general reader, giving as it does not only a succinct chronological and statistical history of the American Whale-fishery, but also vividly portraying the privations, dangers, and excitements attending this daring pursuit, as well as the special training, energy and skill necessary to its successful prosecution. New England may well be proud of the names so favorably mentioned as the founders and leaders in this great enterprise, whose vessels were often the first to bear our national emblem to remote waters and distant seaports.

In the appendix is given a systematic "catalogue of the Cetacea of the North Pacific Ocean" by Mr. W. H. Dall, of the U. S. Coast Survey, prepared with special reference to Capt. Scammon's monograph in the preceding pages of the general work. This catalogue embraces also many osteological notes and descriptions of new forms. The list comprises about forty-four species, which Mr. Dall observes, "appear to be more or less thoroughly characterized," but ten are of unknown habitat. "Leaving these out," he adds (with all species based on insufficient material), we have as the approximate distribution of the known Pacific Cetacea: Japan, five species; northern seas, six species, including two or three which visit California; warm seas and South Pacific, eleven species; coast of Western North America, from the Aleutian Islands to Central America, eighteen species, including several visitors from the Arctic Seas."

The volume closes with a "glossary of words and phrases used by whalemen," and a list of the "stores and outfits" usually taken out by a first-class whale-ship for a Cape Horn voyage.

While Capt. Scammon's work is very satisfactory in the fulness with which it deals with external characters — color, size, form, proportions, etc. — and in its biographical details, the author ab-

* Vol. II, pp. 95–108, 1870.

stains (and perhaps wisely) from a critical discussion of points of synonymy and affinity; yet it is a work that goes far towards filling a wide gap in marine mammalogy, to which subject it is a most welcome and important contribution. The publishers have spared no pains, apparently, to make the work attractive, and the illustrations are generally of a high order of execution. The work is very appropriately inscribed by the author to the memory of Louis Agassiz.—J. A. A.

BOTANY.

Botany of Wilkes' South Pacific Exploring Expedition.—Since the lamented death of Dr. Torrey, his report on the Botanical collections made by the naturalist of Wilkes' expedition on our western American coast, has been printed under the care of Prof. Gray. It makes the larger part of the 17th volume of the results of that expedition, of which, like the rest, only 100 copies are printed by Congress. A small number of extra copies have, however, been secured, at private expense; these are bound up with the preceding part of the volume, devoted to the Lower Cryptogamia of the expedition (Lichens, Algæ and Fungi) and the large plates being folded and bound in, the whole makes a stout royal quarto volume, with 29 plates. The Naturalists' Agency has this on sale, at ten dollars. The mosses of the same expedition by Sullivant, which form the first part of this same volume in the government copies, in the extra edition have the letter-press made up into imperial folio pages, in double columns, to match the 26 great folio plates. A very few copies of this handsome volume still remain in the hands of the late Mr. Sullivant's executors, and can be had for ten dollars each.

Influence of Forests on the Rainfall.—At a recent meeting of the French Academy M. M. Fautra and Sarquiau read a note relative to this subject. They found from experiments made in a forest of more than 500 hectares,* and also on a plain free from trees situated about 300 yards from the forest, that much more rain fell in the wooded part than on the plain.

*A hectare is 11,960 English square yards.